UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/843,882	04/30/2001	Guillermo A. Alvarez	10010559-1	1174

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EXAMINER
YIGDALL, MICHAEL J

ART UNIT	PAPER NUMBER
2122	

DATE MAILED: 01/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- Th MAILING DATE of this communication appears on the cov r sh t with th correspond nc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 August 2004*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   Applicant's response and amendment filed on August 18, 2004 has been fully considered.

Claims 1-23 are now pending.

Response to Arguments

2.   Applicant's arguments with respect to claims 1-20 have been considered but are moot in

view of the new ground(s) of rejection.

Specification

3.   The objection to the abstract of the disclosure is withdrawn in view of the amendment.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No.

6,636,951 to Tachikawa (art of record, hereinafter "Tachikawa") in view of U.S. Pat. No.

6,230,239 to Sakaki et al. (art of record, hereinafter "Sakaki").

With respect to claim 1 (currently amended), Tachikawa discloses a method for migrating

data (see, for example, the title and abstract), said method comprising:

(a) moving a set of data in a data storage system of a computer system (see, for example, column 7, lines 40-48, which shows relocating or moving data in a data storage system);

(b) monitoring a performance of at least one executing application, while said moving is in progress (see, for example, column 13, lines 6-15, which shows monitoring the load or performance conditions of the system while moving the data, and column 10, lines 51-63, which shows that the monitored load condition may be associated with an executing application, such as one operative to record and reproduce image data).

Although Tachikawa discloses modifying a rate of said moving in response to said monitoring (see, for example, column 12, lines 7-13 and 34-41, which shows controlling the moving based on the monitored load condition), Tachikawa does not expressly disclose:

(c) calculating a change in a rate of said moving in response to said monitored performance of the at least one executing application; and

(d) modifying said rate of said moving in accordance with said calculated change.

However, Sakaki similarly discloses a method for migrating data (see, for example, the title and abstract). Sakaki further discloses modifying the migration speed, i.e. modifying the rate of moving (see, for example, column 8, lines 32-36), according to changes in rates calculated based on monitored performance (see, for example, column 8, lines 17-23 and 26-31). The data migration of Sakaki enables improved performance and improved access by the CPU (see, for example, column 2, lines 55-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to supplement the method of Tachikawa with the features taught by Sakaki, so as to calculate a change in a rate of said moving in response to said monitored performance of the at

least one executing application, and modify said rate of said moving in accordance with said

calculated change, thereby improving performance and access to the data.

With respect to claim 2 (original), Tachikawa in view of Sakaki further discloses setting a

performance goal for said at least one executing application, wherein said rate of said moving is

increased in response to said monitoring of said performance exceeding said performance goal

(see, for example, Tachikawa, column 9, lines 12-21, which shows setting a predetermined load

requirement or goal, and column 12, lines 52-61, which shows performing additional moving if

the load is minimal, i.e. increasing the rate of moving if performance exceeds the goal).

With respect to claim 3 (original), Tachikawa in view of Sakaki further discloses setting a

performance goal for said at least one application, wherein said rate of said moving is decreased

in response to said monitoring of said performance not achieving said performance goal (see, for

example, Tachikawa, column 9, lines 12-21, which shows setting a predetermined load

requirement or goal, and column 12, line 62 to column 13, line 5, which shows performing less

moving if the load is such that less time is available, i.e. decreasing the rate of moving if

performance does not achieve the goal).

With respect to claim 4, Tachikawa in view of Sakaki further discloses:

(a) inputting an initial placement of said set of data (see, for example, Tachikawa, column

7, lines 22-33, which shows data location or placement information, and column 11, lines 45-53

and FIG. 5A, which show an initial placement of the data);

(b) inputting a target placement of said set of data (see, for example, Tachikawa, column 7, lines 22-33, which shows data location or placement information, and FIGS. 5B and 5C, which show target placements of the data);

(c) developing a migration plan, said migration plan configured to plan said moving of said set of data from said initial placement to said target placement (see, for example, Tachikawa, column 9, lines 22-31, which shows selecting a relocation program, i.e. a migration plan, in accordance with the placement information); and

(d) executing said migration plan to implement said moving of said set of data (see, for example, Tachikawa, column 9, lines 32-39, which shows executing the relocation program, i.e. the migration plan, to move the data accordingly).

With respect to claim 5 (original), Tachikawa in view of Sakaki further discloses:

(a) setting a performance goal for said at least one executing application (see, for example, Tachikawa, column 9, lines 12-21, which shows setting a predetermined load requirement, i.e. a performance goal); and

(b) wherein said monitoring of said performance is conducted at a periodic sampling interval (see, for example, Tachikawa, column 10, line 64 to column 11, line 10, which shows monitoring the load or performance conditions at a periodic interval).

With respect to claim 6 (original), Tachikawa in view of Sakaki further discloses modifying said rate after said periodic sampling interval in response to said performance of said at least one executing application (see, for example, Tachikawa, column 12, lines 7-13 and 34-41, which shows controlling the moving based on the monitored load condition).

With respect to claim 7 (original), Tachikawa in view of Sakaki further discloses

increasing said rate in response to said performance of said at least one executing application

exceeding said performance goal (see, for example, Tachikawa, column 12, lines 52-61, which

shows performing additional moving if the load is minimal, i.e. increasing the rate of moving if

performance exceeds the goal).

With respect to claim 8 (original), Tachikawa in view of Sakaki further discloses

decreasing said rate in response to said performance of said at least one executing application not

achieving said performance goal (see, for example, Tachikawa, column 12, line 62 to column 13,

line 5, which shows performing less moving if the load is such that less time is available, i.e.

decreasing the rate of moving if performance does not achieve the goal).

With respect to claim 9 (original), Tachikawa in view of Sakaki further discloses:

(a) setting a violation goal, wherein said violation goal is a maximum percentage of

performance violations of all accesses (see, for example, Tachikawa, column 9, lines 40-50,

which shows setting a predetermined suspension requirement, i.e. a violation goal, and column

11, lines 11-15, which shows that such load values may be expressed as percentages); and

(b) restricting, based on the results of said monitoring, said performance violations not to

exceed said violation goal (see, for example, Tachikawa, column 10, lines 5-22, which shows

suspending or restricting the moving in response to exceeding the violation goal).

With respect to claim 10 (original), Tachikawa in view of Sakaki further discloses the

limitation wherein said set of data is moved in increments of portions contained within a logical

volume (see, for example, Tachikawa, column 7, lines 49-58 and column 8, lines 28-35, which show that the data is stored and moved in blocks contained within a logical volume).

With respect to claim 11 (currently amended), Tachikawa discloses a system for migrating data on a computer system (see, for example, the title and abstract), said system comprising:

(a) a monitor configured to monitor a performance of at least one application executing on said computer system (see, for example, column 13, lines 6-15, which shows a monitor for monitoring the load or performance conditions of the system while moving the data, and column 10, lines 51-63, which shows that the monitored load condition may be associated with an executing application, such as one operative to record and reproduce image data);

(b) a controller configured to compare said performance with a performance goal of said at least one application (see, for example, column 9, lines 12-21, which shows a controller for comparing the current load conditions with a predetermined load requirement, i.e. a performance goal); and

(c) an actuator configured to adjust a rate of movement of a set of data from one location in said computer system to another location in said computer system (see, for example, column 7, lines 40-48, which shows an actuator for relocating or moving data in compliance with the controller).

Although Tachikawa discloses that said controller is further configured to adjust said rate of movement in response to said comparison of said performance and said performance goal (see, for example, column 12, lines 7-13 and 34-41, which shows controlling the movement based on the load or performance comparison), Tachikawa does not expressly disclose the

limitation wherein said controller is further configured to calculate a change in said rate of movement in response to said comparison of said performance and said performance goal and adjust said rate of movement in accordance with the calculated change.

However, Sakaki similarly discloses a system for migrating data on a computer system (see, for example, the title and abstract). Sakaki further discloses adjusting the migration speed, i.e. adjusting the rate of movement (see, for example, column 8, lines 32-36), according to changes in rates calculated based on comparisons of performance (see, for example, column 8, lines 17-23 and 26-31). The data migration of Sakaki enables improved performance and improved access by the CPU (see, for example, column 2, lines 55-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to supplement the system of Tachikawa with the features taught by Sakaki, so as to configure said controller to calculate a change in said rate of movement in response to said comparison of said performance and said performance goal and adjust said rate of movement in accordance with the calculated change, thereby improving performance and access to the data.

With respect to claim 12 (original), Tachikawa in view of Sakaki further discloses a logical volume mover configured to move data in increments of portions contained within a logical volume, wherein said actuator is further configured to issue commands to a manager of said logical volume to adjust said rate of movement of said set of data (see, for example, Tachikawa, column 7, lines 40-48, which shows a logical volume mover for relocating or moving data in compliance with a manager, and column 12, lines 7-13 and 34-41, which shows controlling the movement based on the load or performance comparison; also see, for example,

Tachikawa, column 7, lines 49-58 and column 8, lines 28-35, which show that the data is stored

and moved in blocks contained within a logical volume).

With respect to claim 13 (original), Tachikawa in view of Sakaki further discloses a

planner configured to generate a migration plan in response to an input of an initial placement

map of said set of data and a target placement map of said set of data, wherein said migration

plan is configured to provide a partially ordered set of moves for said set of data and to be

executed by said actuator (see, for example, Tachikawa, column 9, lines 22-31, which shows a

planner for selecting a relocation program, i.e. a migration plan, based on data location

information, i.e. placement maps, and column 9, lines 32-39, which shows executing the

program or plan to move the data accordingly; also see, for example, Tachikawa, column 7, lines

22-33, which shows the data location information, FIG. 5A, which shows an initial placement

map of the data, and FIGS. 5B and 5C, which show target placement maps; also see, for

example, Tachikawa, column 10, lines 23-33, which show that the relocation comprises a

sequential set of moves).

With respect to claim 14 (original), Tachikawa in view Sakaki further discloses the

limitation wherein said actuator is further configured to issue a command to increase said rate of

movement of said set of data in response to said controller determining said performance exceeds

said performance goal (see, for example, Tachikawa, column 12, lines 52-61, which shows

performing additional moving if the load is minimal, i.e. increasing the rate of movement if

performance exceeds the goal).

With respect to claim 15 (original), Tachikawa in view of Sakaki further discloses the limitation wherein said actuator is further configured to issue a command to reduce said rate of movement of said set of data in response to said controller determining performance does not achieve said performance goal (see, for example, Tachikawa, column 12, line 62 to column 13, line 5, which shows performing less moving if the load is such that less time is available, i.e. decreasing the rate of movement if performance does not achieve the goal).

With respect to claim 16 (currently amended), Tachikawa discloses a computer readable storage medium on which is embedded one or more computer programs, said one or more computer programs implementing a method for migrating data on a computer system (see, for example, the title and abstract, and column 8, lines 36-45). The limitations of claim 16 are analogous to the limitations recited in claim 1 (therefore, see Tachikawa and Sakaki as applied to claim 1 above).

With respect to claim 17 (original), the limitations of the claim are analogous to the limitations recited in claim 4 (therefore, see Tachikawa and Sakaki as applied to claim 4 above).

With respect to claim 18 (original), the limitations of the claim are analogous to the limitations recited in claim 5 (therefore, see Tachikawa and Sakaki as applied to claim 5 above).

With respect to claim 19 (original), the limitations of the claim are analogous to the limitations recited in claim 9 (therefore, see Tachikawa and Sakaki as applied to claim 9 above).

With respect to claim 20 (original), the limitations of the claim are analogous to the limitations recited in claim 6 (therefore, see Tachikawa and Sakaki as applied to claim 6 above).

With respect to claim 21 (new), Tachikawa in view of Sakaki further discloses:

(a) calculating an error value for the performance of said at least one executing application (see, for example, Sakaki, column 7, line 63 to column 8, line 2, which shows determining or calculating a contention value, i.e. an error value); and

(b) using said error value to calculate said change in said rate of said moving according to a control theory technique (see, for example, Sakaki, column 8, lines 17-23 and 26-36, which shows using the contention or error values to calculate the changes in rates for modifying the migration speed, i.e. for modifying the rate of moving; also see, for example, Sakaki, column 8, lines 20-22 and 29-31, which shows using past information, i.e. feedback information, in the calculations, such as according to a control theory technique).

With respect to claim 22 (new), Tachikawa in view of Sakaki further discloses the limitation wherein said controller is further configured to calculate an error value for said performance of said at least one application (see, for example, Sakaki, column 7, line 63 to column 8, line 2, which shows determining or calculating a contention value, i.e. an error value) and to calculate said change in said rate of movement using said error value in at least one control theory equation (see, for example, Sakaki, column 8, lines 17-23 and 26-36, which shows calculating the changes in rates to adjust the migration speed, i.e. to adjust the rate of movement, using the contention or error values; also see, for example, Sakaki, column 8, lines 20-22 and 29-31, which shows using past information, i.e. feedback information, in the calculations, such as in a control theory equation).

With respect to claim 23 (new), the limitations of the claim are analogous to the

limitations recited in claims 11 and 22 (therefore, see Tachikawa and Sakaki as applied to claims

11 and 22 above).

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to Applicant's

disclosure. U.S. Pat. No. 6,341,333 to Schreiber et al. discloses a method for transparent

exchange of logical volumes in a disk array storage device.

7.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

8.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Michael J. Yigdall whose telephone number is (571) 272-3707.

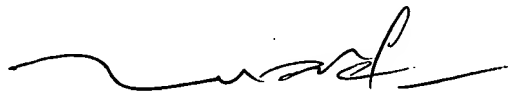The examiner can normally be reached on Monday through Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MY

Michael J. Yigdall
Examiner
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SUPERVISORY PATENT EXAMINER